

MISCELLANEOUS NOTES ON NEOTROPICAL FLORA, XII

Jose Cuatrecasas

Department of Botany, Smithsonian Institution
Washington, D.C. 20560

The present notes include diagnoses or descriptions of new taxa in the subtribe Espeletiinae (Heliantheae, Compositae). For previous contributions see *Phytologia* 45(1): 17. 1980.

LIBANOTHAMNUS DIVISORIENSIS Cuatr. sp. nov.

Arbor 3-5 m alta multiramosa, coma subglobosa, ramusculis ultimis robustis dense foliatis internodiis brevibus dense albo-barbatis pilis sericeis inter vaginas foliorum imbricatas adpressis.

Folia alterna crasse coriacea rigida conspicue pseudopetiolata. Lamina anguste elliptico-oblonga apice subobtusata vel subacuta basim versus attenuata cuneataque, margine integra revolutaque, 19-34 x 5-8 cm, ratio 3.8-5:1; adaxiale pallide viridis vel lutescente viridis glabra costa angusta paulo depressa notata nervis minoribus obsoletis sed superficie leviter rugulosa; abaxiale canescenti-lanata, indumento crispo denso nervatura tegenti sed conspicua, costa robusta angulata striataque valde elevata, nervis secundariis crebris parallelis bene elevatis 2-4 mm inter se distantibus in angulo 70-80° divergentibus, nervis minoribus in reticulo valde prominenti instructis, alveolis minutis profundis cum pilis flexuosis albissimis intricatis repletis. Indumentum pilis tenuissimis crispis intricatisque lanam subtilissimam sed densam formantibus totam superficiem abaxialem tegentem. Pseudopetiolus (1-)2-3 cm longus robustus basi triangulare dilatatus et in vaginam productus. Vagina subcoriacea tubulosa caulem cingens, 2.5-3 cm longa, apice abaxiale unilaterale triangulare in pseudopetiole transienti intus glabra parallele argute nervata, abaxiale densissime pilosa, pilis longis tenuibus albis ascendentibus valde appressis instructis, ad apicem triangulatum dense crasseque albo-lanata.

Inflorescentiae terminales corymboide-paniculatae inferne foliosae superne bracteosae, saepe floribundae, 30-50 cm longae et expansae, folia caulina distalia superantes. Axis valde robustus angulatus striatusque e basi ramosus, ramis principalibus 4-6, proximalibus ad 30-50 cm longis valde robustis angulatis striatisque, alternifoliosis et bracteosis, dimidia vel tertia superiore parte ramulosis. Folia subtendentia proximalia caulina similia sed breviora; laminae 18-14 x 4-3 cm, petiolo cum basi triangulari vaginanti 3-1 cm longo, mediales magnitudine decrescentes 14-9 x 4-2.2 cm, elliptico-lanceolatae acutaeque, sursum gradatim minores et in bracteis transeuntes. Bractee subtendentes ovato-

lanceolatae vel anguste lanceolatae acuminatissimae parallelinerviae, 20-7 mm longae 3-2 mm latae. Axis rami ramusculi dense albo-lanati, bracteis villosulo-lanuginosis. Pedicelli 5-20 mm longi saepe erecti densiuscule crasseque albo-lanati, insuper villosulo-lanuginosi.

Capitula parva radiata 73-90 flores ferentia, ligulis amotis 8-11 mm diam, circulo ligularum 14-21 mm, disco 8-10 mm diametro. Involucrum cupulatum herbaceum pallide viride. Phyllaria sterilia quinque, 7-6(-5) x 4.5-3.2 mm, ovato-acuminata concava, circa 9-nervata, abaxiale sparse pilosa deorsum sparse lanuginea, dorso sursum usque ad apicem dense glandulifera, glandulis subglobosis vel pyriformis, hyalinis, subsessilibus vel sessilibus 0.03-0.05 mm diametro, pilis obtusis vel subclavatis flexuosis ad 1.5 mm longis. Phyllaria fertilia exteriora herbaceo-scariosa, 5-4.2 x (3.5-)2.5-2 mm, obovata apice subite triangulata acutaeque vel cuspidata, parce concava vel subcucullata dorso parce pilosa pilis clavatis vel subclavatis parce flexuosis 0.2-0.5 mm, distale copiose glanduliferis, glandulis obovatis sessilibus vel subsessilibus 0.03-0.05 mm, interiora 4.5 x 2-2.5 mm, obovata apice triangulato-acutata, copiose ciliata pilis subclavatis 0.02-0.03(-0.05) mm, et glandulata. Receptaculum 3.5-4 mm diam conicum 2.5-3 mm altum glabrum. Paleae 4-4.3 x 1.3-2 mm, scariosae, obovatae apice triangulare acutatae, distale dense ferrugineo-pilosae pilis clavatis 0.1-0.3 mm, deorsum longioribus et glandulis subglobosis 0.04-0.05 mm latis apice propio haud pilis sed multis glandulis sessilibus vel subsessilibus praesentibus.

Flores radii ligulati 13-20 in capitulo biseriati. Corolla alba vel eburnea 4-8 mm longa, tubulo 0.8-1 mm longo crasso dense piloso pilis intricatis 0.3-1 mm longis flavescente-hyalinis flexuosis clavatis vel subclavatis; lamina crassiuscula elliptica vel oblongo-elliptica 2.3-3 mm lata, obsolete 3-5-nervata, adaxiale minutissime mammillato-papillosa velutina, abaxiale inferne copiose superne sparse pilosa glanduliferaque pilis 0.2-0.4 mm clavatis, glandulis subglobosis subsessilibus. Stylus 2-3 mm ramis crassiusculis 1 mm longis. Achaenia marginalia (2-)2.5-3 x 1.7-1.8 mm, obovato-triangularia angulis argutis basi acutissima dorso convexo supra basim contracta, interiora 2.5-3 x 1-1.2 mm oblonga subquadrangulata angulo abaxiale obtuso.

Flores disci 55-78 in capitulo. Corolla 4-5 mm longa viridiluteola, tubulo 1.5-2 mm longo, copiose vel sparse piloso pilis 0.2-0.4(-0.6) mm longis clavatis et glandulis crassiuscule pediculatis 0.1-0.15 mm longis, limbo tubuloso-campanulato deorsum sparsis pilis ad 0.6 mm, lobis triangularibus 0.7-1 mm longis margine papillosis abaxiale barbatis pilis clavatis 0.2-0.5 mm longis et parvis glandulis globosis crassiusculis sessilibus saepe praeditis. Antherae 1.6-1.7 mm longae basi obtusiuscule sagittatae appendice apicali ovato-oblonga obtusa 0.4 mm longa. Nectarium tubulosum 0.6-0.8 mm longum. Rudimentum ovarii pediculiforme 0.2-0.3 mm longum.

Typus: Venezuela, Zulia: Sierra de Perija, Serrania de los

Motilones, mesa below international boundary on main ridge, mostly of horizontal red sandstones and grey conglomerates, 3000 m alt, 3-5 m tall trees, rays satiny without, matte within, dirty cream white, disc flowers dirty light yellow-green, 27 Jun-5 Jul 1974, Tillett & Hoenig 746-746; holotype, US; isotypes, VEN, UCV. Other specimens: Venezuela, Zulia, Sierra de Perija, Serrania de Valledupar, along international boundary (Linea Divisoria), headwaters of Rio Apon, 2 km N of Buenavista, 3300-3650 m, tree 2.5 m tall, many-branched and forming a round crown, phyllaries yellow-green, rays cream-white, disc flowers light olive green, 9-10 Jul 1974, Tillett & Hoenig 747-921; paratype, US, VEN. Colombia, Cesar: Sierra de Perija, 25 km east of Codazzi (on the border to Venezuela), 3200 m, tree 13 ft tall 3 in diam b.h., flowers withered, Martin L. Grant 10965 (F, US).

LIBANOTHAMNUS PARVULUS Cuatr. sp. nov.

Arbuscula parva 40-100 cm alta, trunco robusto, fronde ramosa densa viridi plus minusve rotundata. Ramuli terminales dense foliati internodiis spisse sericeo-barbatis pilis 5-7 mm longis tenuibus antrorsis inter vaginas foliorum imbricatas adpressis. Gemmae terminales steriles dense crassissimeque lanato-villosae, indumento ochroleuco valde congesto superficie cum velo tenui-sericeo tecto.

Folia crassa coriacea subsessilia. Lamina elliptica vel anguste oblongo-elliptica apice obtusa vel subobtusa basi subite cuneata vel gradatim in brevem ad modum pseudopetiolum alatum attenuata, 6-10(-15) cm longa, 2.3-4.5 cm lata, ratio 2.2-4(-4.5):1, basi 6-7 mm latam contracta, margine argute revoluta; adaxiale juvenili tenuiter albo-villosa pilis longis tenuissimis adpressis denique caducis glabrata, griseo-viridis opaca plus-minusve glutinosa, tantum costa filiformi impressa notata ceteris nervis obsoletis; abaxiale dense crasse congestissimeque albido-lanata, pilis valde tenuibus flexuosisque crispatis nervatura obtegentibus, costa crassa costulato-sulcata valde eminenti nervis lateralibus patentissimis crebrisque, 1-1.5(-2) mm inter se distantibus, angulo (75°)80-90° divergentibus rectis vel subrectis parallelis, saepe bene conspicuis infra crassum indumentum prominentibus, nervis minoribus reticulum minutum prominulum formantibus, alveolis cum lana alba repletis. Pseudopetiolus 0-1 cm longus, 0.5-0.8 cm latus, costa robusta utroque latere cum lamina revoluta marginata, basi triangulato-amplius in vaginam productus. Vagina apice abaxiale robusta triangulata, semiamplectens, inferne tubulosa 1-1.6 cm alta membranacea, intus glabra parallele nervata, extus densissime crasseque albo-lanato-villosa pilis albis sericeis circa 5-7 mm longis.

Inflorescentiae terminales breves 6-10 cm longae, folia attinentes vel leviter superantes, pauciramosae pedicellis 5-14 mm longis. Rami pedicellique crassi vel crassiusculi cum indumento

albo lanato pilis longis tenuissimis crispatis lana subtilissima sed densissima instructis, superficie pilis adherentibus velum continuum fragilem formantibus. Folia subtendentia ramorum proximalium folia sterilia similima sed paulo breviora. Bracteae mediales subtendentes 2-1 x 0.7-0.3 cm, foliaceae coriaceae revolutae, obtusae, subtus lanatae, supremae similes magis abbreviatae ad 7-5 x 2.5 mm, acutatis.

Capitula 10-11 mm diam, 68-105 flores ferentia, circulo ligularum 16-21 mm, disco 9-10 mm diametro. Involucrum cupulatum. Phyllaria sterilia 7-8, late ovata, acuminata vel ovato-triangularata acuta, 4.5-5.5 x 4-5.5 mm, subcoriacea, inferne incrassata, incurva, extus brunneo antrorso-pilosa pilis crassis subclavatis, insuper saepe tenuiter albo-lanuginea, apice acuto plus minusve calloso glabro, marginibus sursum sparsis glandulis late subglobosis sessilibus. Phyllaria exteriora fertilia 4.5-5 x 3.5-4.5 mm, concava suborbiculata vel obovata breviter acuminata vel obtusa vel subobtusata, basi incrassata dorso dense crassi-pilosa; interiora 4.2-4.5 x 3(-2) mm navicularia subobtusata, distale dense brunnescente crassi-barbata pilis clavatis et glandulis 0.03-0.05 mm longis sparsis. Receptaculum conicum 4-4.5 mm diam, 2 mm altum glabrum. Paleae 4-4.5 x 2.2-2.5 mm, scariosae, hyalinae, obovatae obtusae apice subcucullato, amplexantes, distale dense brunneo-piloso pilis crassis clavatis vel subclavatis 0.2-0.3 mm, glandulis crassis obovoideis subsessilibus et glandulis pediculatis copiosis.

Flores radii 15-22 in capitulo, ligulati 2-3-seriati. Corolla alba 6-7 mm longa, tubo 0.8-1.1 mm longo densissime patulo-piloso, pilis crassis hyalinis obtusis vel clavatis flexuosis ad 0.5 mm longis; lamina crassiuscula elliptica vel oblongo-elliptica 2-2.8 mm lata obtuse 2-3-dentata, adaxiale minutissime mammillato-papillosa, abaxiale circa 5-nervata praecipue ad nervos sparse pilosula et parcis glandulis globosis subsessilibus munita. Stylus 2-3 mm, ramis crassis circa 1-1.3 mm longis. Achaenia marginalia 2.7-3 x 1.5-2 mm, obovato-triangularata basim attenuata basi callosa, angulis argutis, interiora 2.8-3 x 1-1.2 mm, oblonga quadrangularata angulo abaxiali obtuso.

Flores disci 53-84. Corolla 4-5 mm longa lutea vel viridi luteola, tubo 2 mm longo parcis pilis hyalinis clavatis ad 0.4 mm longis et sparsis glandulis subglobosis subsessilibus, limbo infundibuliformi parcis pilis, lobis triangularibus 0.7-0.8 mm altis marginibus incrassatis et satis papillosis, abaxiale parcis pilis crasse clavatis 0.04-0.08(-0.1) mm longis. Antherae circa 1.8 mm longae appendice ovata. Nectarium tubulosum 0.5-0.7 mm longum.

Typus: Venezuela, Lara: eastern slope of Paramo del Cende, 2900 m alt, at Laja del Dictamo, nanoform of tree, erect, "bonsai" style, 40-60(-100) cm high with distinctive trunk and crown, abundant locally, 10 Jun 1971, Ruiz-Teran & Lopez-Figueiras 2036; holotype US; isotype MERF. Other collection: Venezuela, Lara: Paramo de Las Rosas, hill west of Buenos Aires, 3200 m alt, sabana frecuentemente quemada, pastoreada por ganado bovino, planta lenosa hasta 1 m alta, flores amarillas, 15 Oct 1978, Burandt & Hambrook V0406 (UCOB, paratypus).

LIBANOTHAMNUS CRISTAMONTIS Cuatr. sp. nov.

Arbor 5-6 m alta bene ramosa ramulis ultimis distale dense foliatis internodiis brevibus spisse longeque barbatis, pilis inter bases foliorum congeste imbricatas valde appressis.

Folia alterna rigida coriacea subsessilia tubuloso-vaginata. Lamina 10-16 cm longa 3-4 cm lata ratio 3.6-4.3:1, anguste oblongo-elliptica ad apicem angustata acutata, apice mucronata basim versus attenuata basi cuneata usque ad 3 mm latitudine ad modum pseudopetioli brevi (1-8 mm longi) contracta; margine revoluta visu integra sed remotis dentibus callosis mucroniformibus recurvatis abaxiale intra indumentum occultis; adaxiale juvenilis adpresse sericeo-pilosa adulta glabrata plus minusve nitida glutinosa pallide viridis in sicco tabacina nervis fere obsoletis; abaxiale lanata in sicco ochroleuca pilis longis moderate tenuibus crispis et subcrispis intricatis indumento crassissimo densissimeque marginibus et nervis tegenti instructis; infra indumentum costa robusta elevata argute striata, nervis secundariis rectis vel leviter curvis parallelis 2-4 mm inter se distantibus angulo 70-75° divergentibus ad marginem breviter arcuatis anastomosantibus, nervis minoribus elevato-reticulatis alveolis profundis cum lana alba repletis; basi angustata ad modum pseudopetioli anguste alati inferne triangulati-ampliati in vaginam producta. Vagina tubularis 10-15 mm longa membranacea adaxiale glabra abaxiale ochroleuco-barbata.

Inflorescentiae terminales corymbiforme paniculatae floribundae plerumque foliosae superne bracteosae, 12-14 cm longae 18-23 cm latae folia paulo superantes. Axis robustus angulatus et basi ramosus ramis principalibus 4-6 alternis robustiusculis striatis erecto-patentibus, tertia vel imidia superiore parte corymboso-ramulosus ramusculis ultimis 2-3 capitulos longe pedicellatos erectos ferentibus. Pedicelli crassiusculi erecti recti vel leviter flexuosi 6-20 mm longi. Axis rami ramusculi pedicellique copiosissime tomentello-lanuginosi pilis rigidulis 2-3 mm longis flexuosis intricatis et aliquot subrectis indumento laxiusculo pallide ochroleuco instructis. Folia subtendentia inferiora caulina similia sed minora, lamina 9-7 x 2-1.8 cm etiam coriacea rigidaque acuta subsessilia sursum magnitudine decrescentia 7-3 x 1.8-1 cm, basi omnia vaginantia amplexentiaque. Bractee elliptico-oblongae 1.5-1 x 0.5 cm; bractee supremae pedicellos subtendentes 0.8-0.5 x 0.2 cm triangulatae-parallelinerviae.

Capitula breviuscula radiata, 54-90 flores ferentia ligulis amotis 8-10 mm diametro, circulo ligularum 18-20 mm, disco 8-9 mm diametro. Involucrum cupulatum crasse subherbaceum viride. Phyllaria sterilia 5-7 ovato-triangulata subobtusata vel acutata, 3.5-4 x 2.3-2.8 mm, crassiuscula basi incrassata et lanuginea, dorso praecipue sursum granulato-glandulata glandulis globosis margine distali densis, insuper pilis densis brunneis flexuosis ad 1 mm longis obtusis, subclavatis et clavatis intermixtis. Phyllaria fertilia 3.5-4 x 2.5 mm obovata vel obovato-oblonga apice subite

acute triangulata vel obtusa, dorsale et basi valde incrassata, arcuato-incurvata, intus nitida, extus brunneo-antrorso-pilosa, margine apicali copiose glanduloso, glandulis late obovoideis vel globosis hyalinis sessilibus, pilis ad 1 mm longis subclavatis vel clavatis. Receptaculum ovoideum glabrum circa 4 mm latum. Paleae obovato-oblongae subscariosae, apice obtuse subtriangulato, subcucullato, abaxiale sursum dense brunneo-pilosae pilis clavatis antrorsis 0.2-0.3 mm, distale apiceque densis glandulis globosis hyalinis praecipue ad marginem munitae.

Flores radii ligulati 14-20 in capitulo 2-seriati. Corolla alba 6-7 mm longa, tubo 0.2 mm longo dense patulo piloso pilis hyalinis plus minusve flexuosis clavatis 0.3-0.8 mm longis, lamina crassiuscula obovato-elliptica vel oblongo-elliptica 2.3-3.3 mm lata, obtuse 2-3-dentata, 6-9-nervata abaxiale sparsis pilis ad basim copiosis, adaxilae minutissime mammillato-papillosa. Stylus 2 mm, ramis crassiusculis 1 mm longis. Achaenia exteriora 2 x 1.8 mm, obovato-oblonga triangulata basi acutata, interiora 2 x 1.1 mm oblonga quadrangulata.

Flores disci 40-72 in capitulo. Corolla lutea 3.4-3.7 mm longa, tubulo 1.5 mm sursum sparsis pilis 0.3-0.4 mm hyalinis obtusis vel clavatis, limbo tubuloso-infundibuliformi tantum basi parvis pilis clavatis, lobis triangularibus 0.7-0.8 mm longis haud pilis. Antherae 1.3 mm longae. Nectarium tubulosum breviter dentatum circa 0.6 mm longum.

Typus: Venezuela, Lara-Trujillo: entre El Alto y Los Pocitos en la fila o cresta del cerro, paralela al camino hacia Humocaró Alto, divisoria entre Lara y Trujillo, 15 km de Carache, 3150 m alt, árbol 5-6 m, ligulas blanquecinas, 5 Oct 1970, Ruiz-Teran & Lopez-Figueiras 1034a; US, holotypus, isotypus; MERF, isotypí.

L. cristamontis is characterized by the subsessile, rather smaller leaves, thickly lanate below, by the crowded parallel nerves 2-4 mm distant and 70-75° deviation angle, by the smaller heads and flowers, and the glabrous disc-corolla lobes.

LIBANOTHAMNUS NERIIFOLIUS var. *BOCONENSIS* Cuatr. var. nov.

Lamina foliorum 14-30 x 3.5-7.4 cm, elliptica, apice breviter subacutata, basim attenuato-cuneata, nervis secundariis 4-9 mm distantibus angulo 60-70°(-75°) divergentibus; abaxiale dense subadpressoque crispis-lanata, nervis secundariis tectis sed notatis. Capitula 9-10 mm diametro 61-90 flores ferentia. Flores radii 12-20, corolla ligulata lamina 1.6-2.5 mm lata oblonga, tubo 0.3-0.5 mm longo. Flores disci 48-75. Rami inflorescentiae glabrati vel laxiuscule pubescenti.

Typus: Venezuela, Trujillo: Paramo de La Cristalina, forest 2250-2300 m, tree 6-10 m, leaves coriaceous green yellowish above, ashy below, ligules white, 30 Oct 1969, Cuatrecasas, Ruiz-Teran & Lopez-Figueiras 28190; US, holotypus; MERF, isotypus.

LIBANOTHAMNUS NERIIFOLIUS var. TURMALENSIS Cuatr. var. nov.

Lamina foliorum 12-18 x 2.5-4.3 cm, oblanceolata vel elliptico-lanceolata, apice subacuta, basim attenuata, nervis secundariis 2-5(-6) mm distantibus, angulo 65-75° divergentibus; abaxiale indumento satis dense, crasseque crispilano nervos secundarios conspicuos tegenti, costa mox glabrata viridi nitidaque conspicuissima; capitula 7-9(-10) mm lata 56-90 flores ferentia. Flores radii 11-17(-20), corolla ligulata 2-3.3 mm lata, elliptica vel obovato-oblonga tubo (0.2-)0.3-0.5(-0.6) mm longo. Flores disci 45-81. Rami inflorescentiae glabrescentes vel laxe lanugineo-pubescentes.

Typus: Venezuela, Trujillo: Paramo del Turmal (continued with Paramo del Jabon), east of Carache, 2900-2800 m alt, tree 5 m tall, ligules creamy white, disc corollas pale yellow, 3 Nov 1969, Cuatrecasas, Ruiz-Teran & Lopez-Figueiras 28239; US, holotypus; MERF, isotypus.

LIBANOTHAMNUS x GRITAENSIS Cuatr. n. hybr.

= Libanothamnus neriifolius v. columbicus Cuatr. x L. occultus (Bl.) Cuatr.

A L. neriifolius capitulis et floribus majoribus, dentibus corollae disci barbatis, inflorescentia indumento copioso, bracteis subtendentibus capitulorum latioribus amplectentibus ovatis acutissimis, differt.

Arbor 5 m alta. Folia coriacea crassiuscula breviter pseudopetiolata; lamina 20-34 x 5-7.5 cm, adaxiale luteolo-viridi subnitida, abaxiale viridi-cinerea nervis secundariis conspicuis, 3.5-9 mm distantibus angulo 75-80° divergentibus, elliptico-oblonga apice subite subacutata vel subobtusa basi cuneata; pseudopetiolus valde brevis, 0.3-1(-2) cm longus.

Inflorescentiae floribundae foliis proximalibus subtendentibus non petiolatis apice acutis, et sursum bracteis subtendentibus valde amplectentibus apice acutissimis. Rami ramusculi pedicelli-que praecipue ad nodos copiose longeque lanuginosi.

Capitula 11-13 mm diametentia; circulo ligularum 21-33 mm, disco 10-11 mm diam, 71-93 flores ferentia.

Phyllaria sterilia exteriora 5 crassiuscula rigidula ovato-triangulara acuta vel acuminata apice calloso, 5-6.5 x 3.5-4.5 mm, plurinervia, extus densiuscule lanuginosa, marginibus barbatis similia. Saepissime 1-2 phyllaria additionalia interiora. Phyllaria fertilia 4-5 x 2.8-3 mm obovata vel subrhomboidea acuta crassiuscula concava sursum apice calloso glabro excepto pilosa antrorso-ciliata.

Receptaculum 4.5-5.2 mm diam ovoideo-conicum 2 mm altum glabrum. Paleae 4-4.5 x 1.5-2.5 mm, hyalinae amplectentes apice subcucullato glabro granulato-glanduloso infra apicem brunneo-pilosae pilis clavatis.

Flores radii 17-22. Corolla alba vel eburnea 7-8.5 mm longa; tubus 0.8-1 mm longus densissime pilosus pilis hyalinis clavatis ad 1 mm longis; lamina elliptica vel elliptico-oblonga, 2.8-3.2 mm lata, 2-3-dentata circa basim extus pilosula. Stylus 3 mm ramis crassiusculis 0.8-1 mm. Achaenia immatura exteriora 2.3-2.8 x 2 mm obovato-triangulara basim attenuata dorso leviter convexo basi callosa, interiora parca 2.8 x 1.2 mm oblonga.

Flores disci 57-73. Corolla lutea 4.5 mm longa, tubo 1.5 mm longo sursum antrorso-piloso pilis obtusis et clavatis; limbus tubulosus basim parvis pilis; lobi triangulares 0.5 mm alti abaxiale breviter barbati parvis pilis antrorsis. Antherae 2 mm appendice apicali ovata 0.4-0.5 mm longa. Nectarium tubulosum crassum 0.7 mm altum.

Typus: Venezuela, Tachira: Llano de Campoalegre, near La Grita on the way to Paramo del Batallon, remnants of forests, 2500 m, tree 5 m, ray corollas white or cream-white, 2 Oct 1969, Cuatrecasas, Lopez-Figueiras & Marcano-Berti 27999.

The tree partially described above, calls immediate attention because of the larger heads and flowers than Libanothamnus neriiifolius var. columbicus, the dominant species in the particular area.

Besides the larger size of heads (10-13 mm) and flowers (ray flowers 7-8.5 mm; disc flowers 4.5 mm), this specimen differs in having very short petiolated or almost sessile leaves, broader ovate, amplexant and more acute subtending bracts than in all varieties of L. neriiifolius, as well as having more copious, longer lanugineous indument on the inflorescences. In addition, the disc corollas have the lobes hairy on the outside. All indicate that the tree described above is a result of hybridization of L. neriiifolius v. columbicus with L. occultus (Bl.) Cuatr., which was also present and was collected at the same time in the area.

ESPELETIA TILLETII Cuatr. sp. nov.

Caulirosula subessilis visu albida, caule ad 10 cm longo, cum foliis marcescentibus densissime oblecto.

Folia tenuiter subcoriacea flexibilia utrique densiuscule crasseque albo-lanata pseudopetiolata, 26-36 cm longa. Lamina anguste elliptica oblanceolata utrinque attenuata apice acuta interdum subacuta, basim versus in pseudopetiolum gradatim angustata, (16-)20-24 cm longa 1.8-2.3 cm lata, ratio 11-8(-6.6):1, margine integra anguste revolutaque; costa adaxiale plana vel in vetusta deorsum leviter sulcata, abaxiale moderate prominenti subplana striolataque costulato-marginata; nervis secundariis abaxiale tantum notatis 4-8 mm inter se distantibus filiforme prominulis in angulo (30-)40-50°(-55°), ascendentibus prope marginem curvato-anastomosantibus; nervis tertiis irregulariter transversis paulo differentiatitis et cum venulis reticulum crassum uni-vel bi-stratosum valde lanigerum formantibus, alveolis subprofundis ovatis vel

ellipticis fundo subplano visu glabro, cum indumento omnino velatis; utrinque dense crispo-lanata, alba vel cinerea, et praecipue in juvenile statu insuper longe sericeo-villosa, ad costam magis sericea. Pseudopetiolus 3-4 cm longus 4-5 mm latus, costa pluristriata cum lamina utroque latere bene marginata, utrinque lanata et subsericeo-villosa. Vagina subcoriacea rigidula oblonga apice subobtusa (6-)7-8 cm longa, 1.8-2.2 cm lata, argute parallelinervata adaxiale glabra abaxiale longe fulvescenti-villoso-barbata.

Inflorescentiae axillares plures in rosula, foliis duplo triplo longiores erectae. Axis moderate robustus rigidus medullosus, 62-84 cm longus vel ultra, basi ad 1 cm diametro. Pars proximalis vegetativa 1/2-1/3 totae longitudinis, 1-2 paria foliorum sterilium ferens inferiore 1-3 cm supra basim insertum, sequens cum intermedio 3-9 cm longo separatum; folia sterilia opposita lineari-oblongata acuta 17-25 x 1-1.4 cm basi vaginis in tubum plus minusve coalitis, interdum sursum 1-2 foliis sterilibus alternis instructa. Pars distalis fertilis 2/3-1/2 totae longitudinis, 14-20 capitula ferens, tria in cyma terminali, altera in 4-6 ramis (paracladiis) thyrsosideo-paniculatis dispositis; rami saepe in cyma tricephala terminantes vel distales monocephali, mediales saepe oppositi, ceteri spiraliter alternantes; inferiores 20-27 cm longi, sursum gradatim breviores: 13-18 cm, 9-12 cm, distales 5-2 cm. Pedicelli 0.3-0.5 cm, terminales 1-1.5 cm longi. Capitula cymorum saepe glomerata. Bractae subtendentes inferiores foliaceae 16-7 x 1.2-0.8 cm, anguste oblongae, distales 5-2.5 x 0.8-0.5 cm, sublineares. Interdum pare foliorum subbasale folium unum axillari fertile. Axes rami bractae dense crasse albido-lanatae et insuper indumento crassiusculo sublaxo, longe subsericeo-villosi instructae.

Capitula radiata mediocria erecta vel cernua, 130-300 flores ferentia, crasse lanata 25-28 mm diametro, circulo ligularum circa 26 mm, disco 15-16 mm diametro. Involucrum cupulatum (12-)15-16 mm altum. Phyllaria sterilia 14-19 pluriseriata, 7-9 crasse herbacea exteriora lanceolato-ovata acuminata acutissima 19-17 x 8-5 mm, extus densissime albo-lanata, intus glabra 6-8 nervata et plus minusve venoso-reticulata, 9-10 interiora membranacea 15-13 x 5-3 mm abaxiale villosa. Phyllaria fertilia exteriora membranacea 13-12 x 4-3 mm oblonga attenuata acuta adaxiale glabra plurinervata, abaxiale villosa, ad apicem lanuginosa marginibus glandulis pediculatis 0.03-0.08 mm, basi incrassata; interiora 12-11 x 3.5-2.5 mm magis amplexantia. Receptaculum subplanum glabrum 10 mm diametro. Paleae subscariosae 9 x 2 mm, oblongae acutae naviculares plurivenia distale barbatae pilis flexuosis 1 mm longis et glandulis pediculatis sursum sparsis munitae.

Flores radii ligulati 30-64 in capitulo 3-4-seriati. Corolla lutea 12-13 mm longa, tubo 2 mm longo copiose piloso apice saepe appendice adaxiali linguliformi ad 4 mm longa, pilis 0.3-0.8(-1) mm longis obtusis vel subacutis et glandulis pediculatis copiosis; lamina oblonga 2.2 mm lata profunde 2-3-dentata, deorsum marginale plicata, abaxiale copiosis glandulis brevi-pediculatis. Stylus 7-8 mm ramis 1-1.5 mm longis. Achaenia marginalia 2.5-2.7 x 1.5 mm

obovoidea 3-angulata dorso plano-convexo basi contracta; interiora 2.7-2.9 x 1 mm, oblonga quadrangulata.

Flores disci 100-235 in capitulo. Corolla viridi-lutea 7.5-8 mm longa, tubulo 2 mm longo parvis pilis obtusis 0.3-0.8 mm et praecipue sursum copiosis glandulis pediculatis 0.03-0.07 mm, limbo tubuloso tantum parvis pilis et glandulis basi munito; lobis luteis triangulari-oblongis 1.1-1.3 mm longis crasse marginatis apicem incrassatis, abaxiale copiosis glandulis globosis brevipediculatis munitis, haud pilis. Antherae 3-5 mm longae basi breviter sagittatae appendice ovata subacutata 0.5 mm longa. Stylus 7.5-8 mm, apice bilobato longe denseque papilloso. Nectarium anguste tubulosum 0.7-0.8 mm longum.

Typus: Venezuela, Zulia: Sierra de Perija-Serrania de Valledupar (Venezuela-Colombia boundary), campamento "Monte Viruela" on tepui-like limestone massif 5 x 2.5 km, 3100 m alt; stem 1 dm, pungent umbellifer odor, white hairy, rays matte medium yellow, disk flowers medium greenish yellow with yellow tips, sweet fragrance, visited by bees and hummingbirds, 21-28 Jul 1974, S.S. Tillet 474-1126, holotypus US; isotypi VEN, MYF.

Espeletia tillettii is a close relative of E. perijaensis Cuatr. from which it differs mainly by the leafy vegetative section of inflorescences, by the higher number of heads on each inflorescence, the lack of hairs on the disc-corolla lobes, and by the narrower weaker vegetative leaves, also with narrower, oblong sheaths.

ESPELETIA PRAEFRONTINA Cuatr. sp. nov.

Caulirosula usque ad 5 m alta, visu ochroleuco-sericea.

Folia coricea adulta rigida, utrinque dense ochroleuco-lanata insuper saltem juvenilia subsericeo-villoso-barbata, sessilia. Lamina anguste elliptica sub lanceolata apicem versus angustata acutae, basim versus gradatim moderate attenuata, margine integra revolutae, 20-25 cm longa, 4-5.5 cm lata, the ratio 3.7-6:1, basi 1.3-1.8 cm lata; adaxiale dense congeste crispo-lanata insuper subadpresso subsericeo-longi-villosa pilis tenuibus ad 10 mm longis, costa leviter conspicua; abaxiale costa elevata striataque dense crispo-lanata, nervis secundariis prominentibus plus minusve notatis, 5-8(-10) mm inter se distantibus in angulo 40-50° ascendentibus, nervis tertiis transversis flexuosis prominentibus cum nervulis fere elevatis in reticulo anastomosatis, alveolis ovatis profundiusculis parce pilosulis, reticulo copiosissime longe piloso indumentum intricatum crispo-lanatum crassum laminam tegentem orienti. Vaginae rigide coriaceae ovatae vel oblongo-ovatae, apice obtuse cuneatae, 5-6 x 5-7 cm, adaxiale glabrae argute nervatae, abaxiale longe fulvescente sericeo-barbatae pilis circa 15 mm rectis antrorsis adpressis tectae, apice densissime congeste crasseque lanatae et barbatae. Folia incipientia valde revoluta crassissime adpressoque induta visu aureo-sericea.

Inflorescentiae axillares thyrsoides, 3-5 capituliferae, omnino dense crasseque luteo-lanatae barbataeque folia rosulae paulo (1/5-1/4) excedentes. Axis mediocris 40-43 cm longus erectus striolatus. Pars proximalis vegetativa 34-37 cm longa, 1-2 paribus foliorum sterilium instructa, foliis infimis 2.5-4.5(-9) cm supra basim orientibus, internodio proximali 17-22 cm, sequenti 10-15 cm longus, foliis proximalibus oblanceolato-oblongis 10-16 cm longis 1-1.8 cm latis, basi longe vaginantibus breviterque connatis, alteris 5-9 x 1-1.3 cm oblongis brevius vaginantibus connatisque. Pars distalis fertilis brevis 5-3 capitulifera, cyma bracteata tri-cephala terminalis et uno vel duobus paracladiis oppositis mono-cephalis instructa; internodium 2.5-3.5(-8) cm longum; rami seu pedunculi proximales 3.5-5(-8) cm longi; cyma terminalis pedicello centrali 1.8-3.5(-5) cm longo, lateraribus 1.5-2.5(-5) cm, aliquando capitulo mediali tantum evoluto ambobus lateralibus defectis et bracteis solis sterilibus remanentibus. Pedunculi seu pedicelli apice recurvi capitulis fortiter cernius, vetustis nutantibus. Bractaeae subtendentes pedunculos aequilongae, proximales 3.5-4.5 (-8) x 1-1.2 cm, oblongo-lanceolatae acutae basi ampliatae, distales 3-3.6 x 1 cm ovatae plus minusve acuminatae acutae. Inflor-escencia tota dense lutescenti-lanata et plus minusve barbata.

Capitula radiata mediana cernua 22-25 mm lata, 152-242 flores ferentia, circulo ligularum 30-35 mm, disco 13-17 mm diametientia. Involucrum cupulatum copiose lutescenti-lanatum barbatumque 14-17 mm altum. Phyllaria sterilia crassiuscula, 4 exteriora 20-17 x 11-10 mm ovata vel elliptica acuminata, dense crispo-lanata, saepe 4 interiora 14-9 x 7-4 mm ovato-oblonga vel oblonga acuta, crispo-lanata. Phyllaria fertilia exteriora (14-)8-7 x (10-)3.5-3 mm, elliptica subite acutata abaxiale lanuginosa vel villosa-lanuginea, distale ferrugineo-barbata pilis 2-1 mm longis; interiora (9-)6.5 x 3.5-2.7 mm tenuia elliptica acuta dorso marginibusque pilosa et copiosis glandulis pediculatis 0.03-0.07 mm longis. Receptaculum circa 8 mm diametro glabrum. Paleae (8-)6-5.5 x (3.6-)3-2 mm, scariosae, ovaes acutae nervatae, amplexantes dorsale subapicem sublanugineo-barbatae pilis flexuosis 1 mm longis, et copiosis glandulis columnaribus 0.03-0.08 mm longis.

Flores radii ligulati 34-36. Corolla lutea 11-14 mm longa, tubo 2-2.5 mm longo, copiose piloso et sparse glanduloso pilis obtusis vel subacutis 0.2-0.4 mm interdum sursum abaxiale usque 1 mm longis, glandulis pediculatis basim incrassatis ad 0.05 mm longis; lamina crassiuscule firma, elliptico-oblonga, 2-3.5 mm lata inferne extus pilosula, abaxiale 9-11 venis prominentibus et tota sparse glandulifera, adaxiale mamillato-papillosa aspectu velutina. Stylus 3.5-4 mm ramis 1-1.3 mm longis. Achaenia exteriora 3 x 1.8 mm oblongo-obovata apice obtusa subtruncata, triangulata, interiora 3.2 x 1 mm quadrangulata oblonga.

Flores disci 116-208. Corolla lutea 6.5-7(-8) mm longa, tubo 3-3.5 mm longo angusto sparsis pilis obtusis deorsum incrassatis 0.1-0.4 mm longis et glandulis pediculatis praecipue sursum munito, limbo tubuloso-infundibuliformi tantum basi parce pilosulo

et glandulifero; lobi 0.7-0.8 mm triangulares, marginibus incrassatis valde papillois, abaxiale sparsis glandulis 0.05 mm. Antherae 2.4 mm appendice apicali ovata 0.4 mm. Nectarium tubulosum circa 1.2-1.8 mm altum quinquentatum.

Typus: Colombia, Antioquia: Cordillera Occidental, Paramo de Frontino circa Llano Grande, 3450 m, 27 Oct 1976, Jeff D. Boeke & J.B. McElroy 273 (US, holotypus; NY, isotypus). Paratype: Paramo de Frontino, 3500 m, 1 Dec 1970, Rivera, Llano & Ruiz 784 (COL, US).

ESPELETIA AZUCARINA Cuatr. sp. nov.

Caulirosula. Folia 34-37 cm totae longitudinis; lamina oblonga apice acuta basim versus sine sensu attenuata, 26-30 cm longa, 3.2-3.7 cm lata, ratio 7.8-9.3:1, supra basim 1.4 cm minima latitudine, margine integra leviter revoluta, costa supra plana subtus crasse elevata, nervis secundariis abaxiales notatis 5-7 mm inter se distantibus angulo 40-45° ascendentibus, utrinque dense albo lanata; vagina trapeziale-oblonga apice obtusa basi latiore, 6.5-8 cm longa, 5.5-7 cm lata.

Inflorescentiae circa 48 cm longae rosulam 1/3 excedentes parte sterili 4 paribus foliorum sterilium, parte fertili circa 17 capitula ferentia cum cyma terminali et 3 paribus ramorum ascendentium instructa.

Capitula radiata 20-22 mm lata erecta vel cernua 233 flores ferentia, circulo ligularum 30 mm, disco 15-16 mm diam. Phyllaria sterilia valde lanata ovata acuta, 12-9 x 8-4(-3) mm; phyllaria fertilia exteriora lanci-ovata acuminata, sparse antrorso-villosa sursum villosa-barbata, 8 x 3.2 mm. Receptaculum 7.5-8 mm latum; paleae 6-6.5 x 2 mm hyalinae dorso-distali ciliato-barbatae. Flores radii ligulati 82 triseriati, corolla lutea 9-11 mm longa tubulo 1.5-1.8 mm longo dense piloso pilis crassiusculis obtusis patulo ascendentibus, interdum subacutis, 0.2-0.4 mm longis et glandulis subsessilibus interspersis, lamina 2 mm lata, obtusa, 6-7 nervata, abaxiale basi parce pilosa reliqua sparsis glandulis praedita. Flores disci circa 150, corolla lutea 6-6.5 mm longa, tubulo 2.5 mm longo copiose piloso praecipue sursum, pilis crassiusculis obtusis vel subobtusis ascendentibus, 0.2-0.4 mm, plus parvis glandulis sparsis, lobis triangularibus crasse marginatis 1 mm longis abaxiale sparsis vel copiosis glandulis sessilibus.

Typus: Colombia, Boyaca: Macizo alto, al N de Belen, municipio Tutasa, Cerro Pan de Azucar y vecindad, paramo pedregoso seco, vert. E del cerro, 4000 m; frailejones asociados con Calamagrostis effusa; caulirosula 1 m, hojas grisaceas, ligulas amarillas, 7 May 1973, A.M. Cleef 9835 (US, holotypus; COL, U, isotypi).

Espeletia azucarina differs essentially from *E. jaramilloi* by its narrow-oblong leaves, smaller inflorescences and shorter ray corolla tube. It is also closely related to *Espeletia cleefii* because of its floral and inflorescential features; however, the strongly lanceolate (proximally contracted) type of leaf of *E.*

cleefii taxonomically separates this species from the Pan de Azucar plant.

ESPELETIA BRASSICOIDEA subsp. ANGUSTA Cuatr., subsp. nova

Folia 43-49 cm totae longitudinis, lamina elliptica oblanceolata acuta vel subacuta, 26.5-38 cm longa, 3.5-5.5 cm lata, ratio 5-9:1, basi 11-7 mm angustata; vagina 9-10 x 4.5-5 cm.

Capitula saepe latiora, 30-45 mm diametro (ligulis amotis) in sicco, 187-234 flores ferentia, 49-54 feminei, 138-180 masculi. Corollae radii 16-17 mm longi, tubulo 4-4.5 mm longo, lamina lineari 1.5-1.8 mm lata. Corollae disci 9-9.5 mm longae, tubo 3.5-4 mm, lobis 1.2-1.4 mm longis, saepe glabris sed interdum 1-2 pilis in uno vel duobus lobis. Involucrum saepe cum phyllariis sterilibus interioribus additionalibus in totum 11-14 phyllariis.

Typus: Colombia, Norte de Santander, between Pamplona and Berlin, left side of the road, km 89, subacaulirosuletum, chromosome number $n = 19$, appearance white, 23 Sep 1969, Cuatrecasas & Rodriguez 27916 (US, holotypus; COL, isotypus).